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NOTES ON GEOGRAPHIC DISTRIBUTION

Myxomycetes, Physarales, Physaraceae, *Physarum rigidum* (G. Lister) G. Lister: Distribution extension and new records

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Members of the Physarales (Myxomycetes, Myxogastromycetidae) are widely distributed throughout the different Brazilian states and ecosystems (Cavalcanti 2002; Maimoni-Rodella 2002; Putzke 1996; 2002). Nevertheless, knowledge about Brazilian Myxomycetes is still very incomplete and many Physarales species are known to occur in a few states and localities. Considering that little is known about the distribution and abundance of species of Physarales in Brazil, this paper intends to comment the distribution of *Physarum rigidum* (G. Lister) G. Lister in the country, based on herbarium study, literature review, and collections made in Serra da Capivara National Park, southeast state of Piauí.

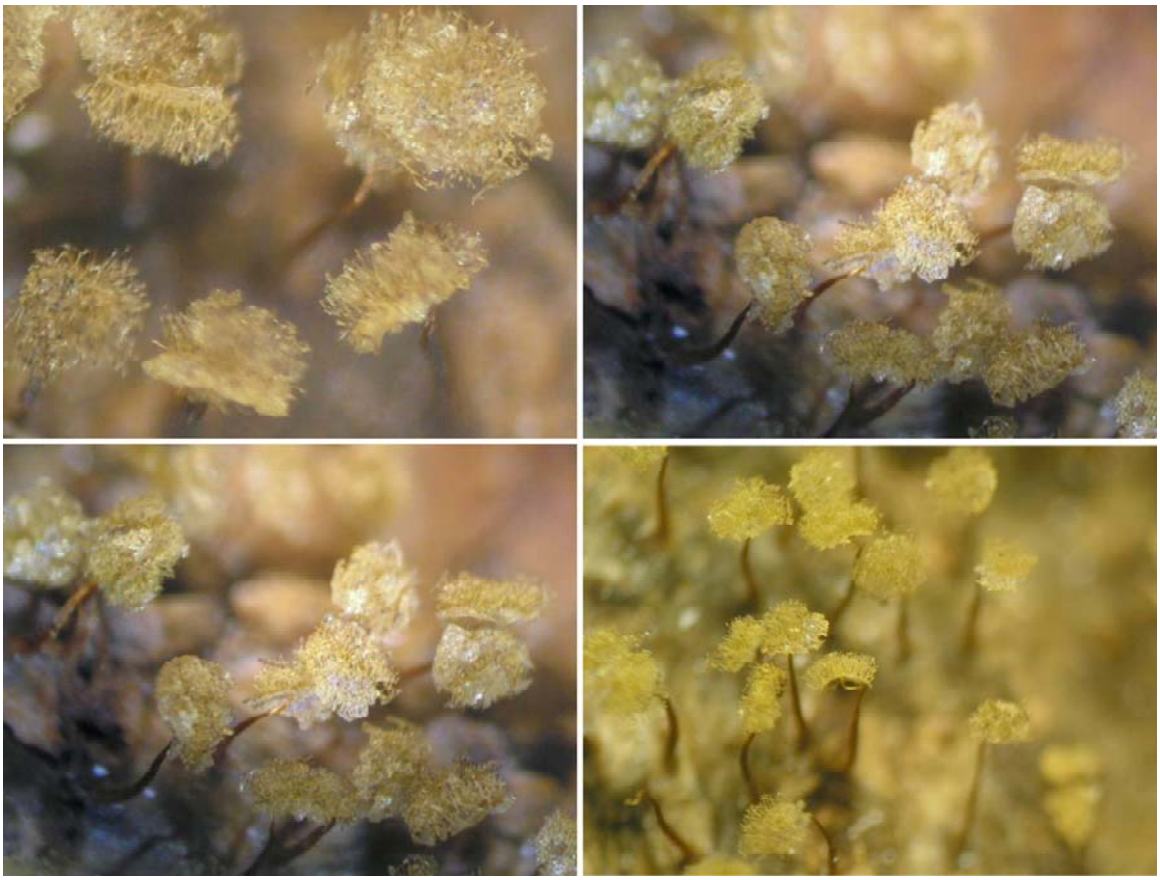

Figure 1. Sporocarps of *Physarum rigidum* (G. Lister) G. Lister from Serra da Capivara National Park, micro-region of São Raimundo Nonato, state of Piauí, Brazil.

Physarum rigidum occurs in south Nigeria, Sri Lanka, South Korea, Japan, Taiwan, China, Nepal, United States, Uruguay and Brazil (Lister 1925, Martin and Alexopoulos 1969; Farr 1968; 1976). The specimen reported by Garcia-Zorron (1967) for Uruguay was the first report of this species for South America, while Farr (1968) published the first record for Brazil, based on a specimen collected in state of São Paulo. *Physarum rigidum* was known in Brazil from only two localities in the state of São Paulo, Southeast region, and in one locality in the state of Pernambuco, Northeast region (Farr 1968, Cavalcanti 2002; Bononi et al. 1981; Hochgesand and Gottsberger 1996; Maimoni-Rodella 2002; Putzke 1996).

The yellow phaneroplasmodium of *P. rigidum* is capable of forming many stalked sporocarps, 0.5-2 mm high, with lenticular sporotheca (Figure 1). This species is primarily associated with woody microhabitats (corticolous and lignicolous); however, it may be less frequently found in association with the fruiting bodies of fungi (myceticolous), such as *Schizophyllum commune* Fr. In fact, the first published record for Brazil was based on specimens fruiting on an unidentified species of Polyporaceae (Farr 1968).

According to Lister (1925), the capillitium of this species consists of "sparingly branched threads or flattened tubes with long narrow orange lime-knots", sometimes "consisting almost entirely of slender rod-like tubes enclosing lime-granules¨. Although closely allied to *P. viride* G. Lister, this species may be distinguished by the character of the capillitium and by the larger (9-12 µm diam.), rich violet-brown, minutely spinulose or verruculose spores. As in all Physaraceae, the amount of lime in the sporocarp is variable and when it is scanty the membranous peridium is fragile and iridescent.

On November 1966, sporocarps of *P. rigidum* were collected by B. Skvortzov at the Fontes do Ipiranga State Park (23°38' - 23°40' S, 46°36' - 46°38' W, 560 ha, 890 m above sea level), an Atlantic Forest remnant completely surrounded by residential areas and roads in the municipality of São Paulo. The specimen, deposited at the *Herbário do Estado* (SP 97667), with a duplicate (809948) at the BPI Collection (Farr et al. 2007), identified by M. L. Farr, represents the first record of the species on Brazilian territory (Table 1). The fructification on a polypore reported by Farr (1968) as the first report of the species for Brazil probably was based on this specimen.

Six years later (March, 1972), three typical specimens were collected in a survey of corticolous myxomycetes conducted by Laise de Holanda Cavalcanti (LHC) at the *Estação Experimental de Biologia e Piscicultura*, municipality of Pirassununga, São Paulo (21°59'45" S, 47°25'33" W, 627 m above sea level), extending its range ca. 210 km NNO from the previous reported locality, in the same state (Cavalcanti, unpublished data). The specimens were found in the area with savanna-like vegetation preserved against fire for some thirty years, with a semi-closed tree canopy (*cerradão*) and in a more open area, with scattered trees and shrubs, all subjected to annual fires (*campo-cerrado*). In the field collection (Cavalcanti 404, on bark of living unidentified tree), and moist chamber specimens (Cavalcanti 408, dead wood, *campo-cerrado*; Cavalcanti 410, bark of living *Erythroxylum suberosum* St. Hil., Erythroxylaceae, *cerradão*), the sporangia were abundant, ca. 1,5 mm high, with subulate, reddish-brown stalks, typical capillitium and red-brown spores, 9-12 µm diam., equally verrucose all over.

According to check lists of Brazilian Myxomycetes published by Cavalcanti (2002), Maimoni-Rodella (2002) and Putzke (2002), *P. rigidum* only occurs in the states of São Paulo and Pernambuco. However, a specimen deposited in the USDA-SBML, BPI 805445 (Farr et al. 2007), found in April 1968, without collector name, the only locality information on the box says that it is from Brazil and no state or other locality data are listed, except the geographic coordinates. Considering site coordinates (9°9' S, 50°9'13" W) the specimen was found somewhere in the middle-southeast micro-region of state of Pará, near the town of Casera, state of Tocantins, Northern Brazil and hence it constitutes the northernmost record for *P. rigidum* in the country and the first record for the species in the northern region.

In the Northeast region, *P. rigidum* was only known from the coastal zone (state of Pernambuco, municipality of Recife, 8°04'03" S, 34°55'00" W, 4 m above sea level). The specimens, collected in March 1968 by LHC, consist of a few sporangia developed on bark of living trees (*Mangifera indica* L., Anacardiaceae; *Eugenia* sp., Myrtaceae), in urban backyards. These specimens were deposited at the UFP Herbarium, Myxomycetes collection, *Universidade Federal de Pernambuco*, Brazil (UFP 02311, UFP 02579). Since then, no other

P. rigidum specimen was found in the Northeast region.

During a more recent survey for myxomycetes in the micro-region of São Raimundo Nonato, southeastern Piauí, the species was found one more time in the northeast region, 39 years after its last record, extending its known distribution range ca. 900 km beyond municipality of Recife. The specimens of *P. rigidum* were collected at the Serra da Capivara National Park (SCNP) (8°26'-8°54' S, 42°19'- 42°45' W, 129.140 ha, 500-600 m above sea level), southeast Piauiense middle-region. The SCNP territory, under a semiarid climate, with a strongly variable precipitation (250-1270 mm/year), is covered by several xeric deciduous plant associations, from dry, open woodland to thorn scrub with cacti and bromeliads (Olmos 1993). Caesalpiniaceae, Fabaceae, Mimosaceae and Myrtaceae are dominant in the wood component of the vegetation, specially *Acacia langsdorffii* Benth., *Campomanesia* sp., and *Pterodon abruptus* (Moric.) Benth. (Lemos and Rodal 2002).

In the SCNP this species was first found on dead wood in May 2006 (dry season) by MPP, in Serra Branca, near *Toca do Povo da Extrema II*, a dense *Caatinga* area. Since then, this species has been collected in SCNP, on the same locality in March 2007 (rainy season), fruiting on dead wood and twigs.

The sporocarp of *P. rigidum* presents a striking aspect in the stage where the peridium is broken and exposes the rigid calcareous tubes of the capillitium. The seven specimens from SCNP illustrate this well (Figure 1).

Cavalcanti (2002) lists the Myxomycetes species known to occur in state of Piauí. Cavalcanti et al. (2006) updated this earlier information and listed 50 species, including 18 species of Physarales, from the Lower and Mid-Parnaiba micro-regions in the northwest of that state. There is no reference in these lists about *P. rigidum* collections. Thus, the present record is the first for this species from the state of Piauí and increases its geographical range ca. 2000 km N from the locality of the first Brazilian record (Table 1).

Physarum rigidum has been documented to occur in the Atlantic Forest remnants (Farr 1968; Bononi et al. 1981; Hochgesand and Gottsberger 1996), *Cerrado* vegetation and urban back yards (Cavalcanti 1976; 2002), at elevations ranging from sea level to ca. 860 m. The collections reported herein represents the first report of this species from *Caatinga*, a type of deciduous dry forest found exclusively in the Brazilian territory.

SITE	COORDINATES	HABITAT	PERIOD
Parque Estadual das Fontes do Ipiranga - SP	23°38'-23°40' S, 46°36'-46°38' W	Atlantic Forest	Nov. 1966
Recife - PE	08°04' S, 34°55' W	Urban Backyards	Mar. 1968
Pará, near Casera - TO	09°09' S, 50°09'13" W	Not indicated	Apr. 1968
Estação Experimental de Biologia e Piscicultura, Pirassununga - SP	21°59'45" S, 47°25'33" W	Savanna-like	Mar. 1972
Parque Nacional Serra da Capivara - PI	08°26'-08°54' S, 42°19'- 42°45' W	Caatinga vegetation	Mar. 2007

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